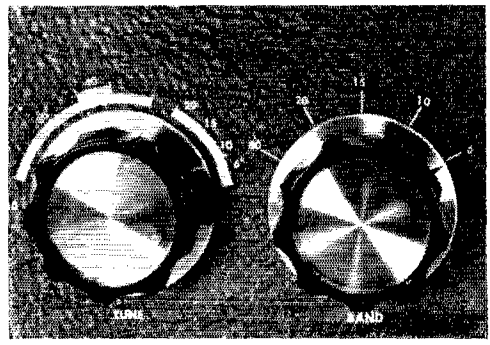
Using The Heath SB-200 Linear On Six Meters



Decals have been added to "dress-up" the front panel and indicate the changes made.

BY HENRY A. BLODGETT,* W2UTH/W2FRL

To eliminate a 6-ft. rack—full of low-frequency and 6-meter amplifiers, power supplies and control systems—and substitute a table-top amplifier, my interest focused on the Heath SB-200 after I heard that WA4VUT had made it work on 6 meters by eliminating the 10-meter band. As purchased, the Heath SB-200 is a 1200-watt p.e.p. input, 80 through 10 meter, band-switched linear amplifier. Discussions with W2PNQ resulted in a mutual decision to give the rig a try, but to eliminate the 40-meter band instead, since neither of us professed much interest in that band. The conversion was first completed by W2PNQ, and to him goes most of the credit for laying the ground work.

Basically the modification is completed in two separate steps, both of which may be completed in a short evening's work. First of all, the pi-network output circuit of the SB-200 is modified so that it will tune the 6-meter band as shown in Fig. 1. Secondly, a 6-meter tuned cathode input circuit is installed as shown in Fig. 2.

The 40-meter tap on the final amplifier tank coil L_7 is no longer used. Instead, a new tap one turn from the plate end of the 10-15-meter tank coil L_6 is added to provide for 6-meter operation. The band-switching sequence becomes 80, 20, 15, 10, 6 meters, with the 20-meter coil tap being connected to the former 40-meter band-switch contact. The higher-frequency bands are also moved up on the band switch rotation in a similar manner.

The author chose to modify the existing tuning capacitor, C_{25}, although a Johnson (154-12) 53-pf. capacitor may be substituted if an additional 100-pf. capacitor is connected in parallel for 80-meter operation. To modify the Heath capacitor, four plates are removed, one rotor and one stator from each end of the capacitor. The result is a capacitor with a minimum capacitance of 9.5 pf. and a maximum of 126 pf., sufficient to tune the 80-meter band with no problem.

To modify the input circuit, the 40-meter cathode coil, L_4, and the associated capacitors, C_{31}, C_{32}, are removed. The succeeding coils are advanced one position; i.e. the 20-meter

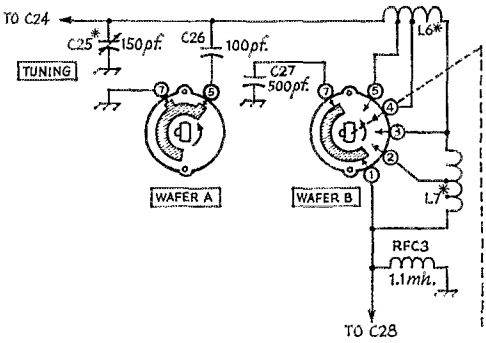
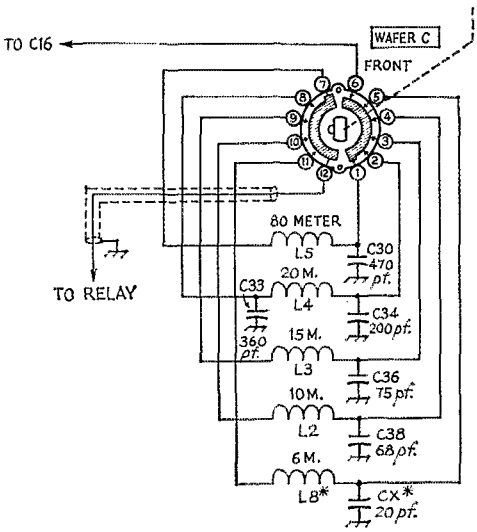


Fig. 1—Output circuit. Components which have been altered are marked with an asterisk. Specific details are included in the text.

*1515 Victor-Holcomb Road, Victor, New York 14564.

Fig. 2—Input circuit. New components which have been added are marked with an asterisk. Specific details are included in the text.

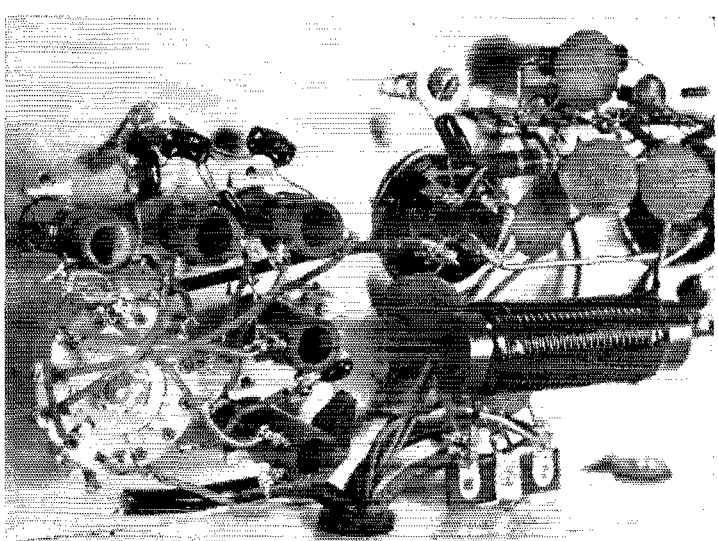


coil is mounted in the 40-meter chassis position and is connected to the old 40-meter band-switch contact. All the original turns of the 40-meter cathode coil are removed. A new 6-meter coil is wound on this form with three turns of No. 16 enameled wire. Alternatively, a new 10-meter coil (which also tunes 6 meters) may be purchased from Heath as part No. 40-728. The 6-meter cathode coil, L_8, is mounted in the old 10-meter coil location, *CA*. A 20-pf. dipped mica capacitor C_x is also added to complete the 6-meter L network.

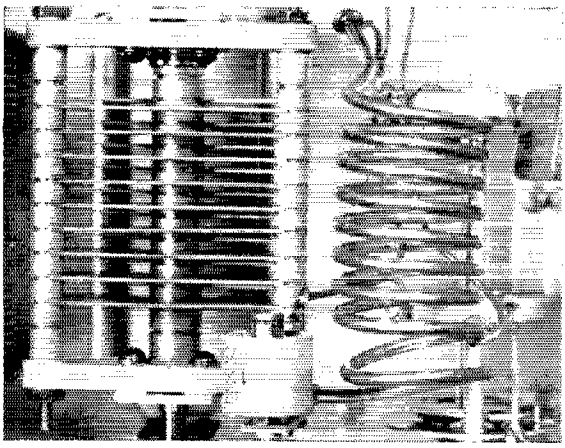
Manual-Type Instructions

Many fellows would like to have modification instructions similar to those provided in the SB-200 manual. The instructions given below may be used to supplement the Heath manual and will be especially helpful when the kit is initially being assembled. All page references given are for Heath manual No. 595-682. The new instruction steps given replace only the specified step numbers in the manual. All other steps remain as originally written.

1) Prior to step 1, p. 18, insert a new step: Modify the plate tuning capacitor (26-96) as previously mentioned in this text.
2) Step 1, p. 23: Connect a 2-inch bare wire from lug 1 of coil AG (S-1) to lugs *B3* of switch AK (NS).
3) Step 2, p. 23: Connect a 3-inch bare wire from lug 2 of coil AG (S-1) to lugs *B2* of switch AK (S-1).
4) Eliminate step 3, p. 23.
5) Step 8, p. 23: Locate the 10-15-meter final tank coil (40-596). Pass the center wire of this coil through lugs *B4* of switch AK (NS).
6) Step 10, p. 23: Position the end of the coil opposite the solder lug, between lugs *B3* of switch AK (S-2).
7) Step 11, p. 23: Now solder lugs *B4* of switch AK (S-1).
8) At this point insert a new step: Add a new tap at 1 turn from end of 10-15-meter coil (solder lug end) and connect to lugs *B5* of switch AK (S-1). Use No. 14 bare wire.
9) Step 17, p. 36: Referring to detail 10A, install the (40-728) coil at *CB*. Press the coil until the retaining clips snap into place.
10) Step 18, p. 36: In like manner install the (40-727) coil at *CC*.
11) Step 19, p. 36: Install the (40-593) coil at *CD*.
12) Eliminate step 20, p. 36, and substitute: Install the 6-meter cathode coil at *CA*.
13) Step 22, p. 36: Connect a 68-pf. mica ca-



Modified input circuit. Cathode coils are positioned in an "L" around the band-switch wafer. The new 6-meter coil, L_8, positioned in location CA which is located in the upper left portion of the photograph. The relocation of the other coils is discussed in the text.



Modified plate circuit. Note that plates have been removed from the large tuning capacitor, C_{25}. The new tap on the coil, L_{9}, is for 6-meter operation.

pacitor from lug 2 of coil *CB* (NS) to lug 1 of solder lug AE (NS).

14) Insert a new step: Connect a 20-pf. mica capacitor, C_x, from lug 2 of coil *CA* (NS) to lug 1 of solder lug AE (S-2).
15) Step 23, p. 36: Connect a 75-pf. mica capacitor from lug 2 of coil *CC* (NS) to lug 2 of solder lug AE (NS).
16) Step 24, p. 36: Connect a 200-pf. mica capacitor from lug 2 of coil *CD* (NS) to lug 2 of solder lug AF (NS).
17) Eliminate step 25, p. 36.
18) Step 1, p. 38: Connect a 360-pf. mica capacitor from lug 1 of coil *CD* (NS) to lug 2 of solder lug AE (S-2).
19) Eliminate step 2, p. 38.

This completes the additions to the instruction manual.

Performance

The SB-200 is easily driven on 6 meters by a Heath SB-110A. The amplifier's indicated grid current is 60-70 ma. With this amount of drive, the amplifier can be loaded to at least 900 watts d.c. input. A Swan 250 or any other 6-meter exciter in this power class should also drive the amplifier adequately. All tuning procedures described by Heath apply to the modified amplifier. For approximate reference only, the dial readings on my SB-200 are: LOAD-6¾ and TUNE-about ⅛-inch below the 10-meter white line toward the minimum capacitor setting. The indicated power output is 450 watts into a Heath Cantenna, as measured on a Bird Wattmeter. On-the-air reports indicate that the quality of the Heath SB-110A is faithfully reproduced and adequately amplified by the SB-200.

This modification in no way affects the operation of the amplifier on the remaining low-frequency bands. While a little improvement may be obtained from a linear built for 6 meters alone, this unit makes a more than satisfactory compromise.

The author wishes to thank Frank Gaenger, W2PNQ, for his efforts and assistance in this conversion, and Link Cundall, W2QY, for his photography. Circuit diagrams and original manual-type instructions are courtesy of the Heath Company.

NEW BOOKS

Adventures With Electronics, by Walter B. Ford. Published by The Bruce Publishing Co., 400 N. Broadway, Milwaukee, Wisc. 53201. 184 pages, including index, 6¼ + 9½ inches, hard cover.

Here is indeed a fascinating book. While intended primarily for the Industrial Arts student who is presumed to have some knowledge of electronics and who is reasonably handy with shop tools, radio amateurs, whether Novice or old timer, will be surely tempted to undertake some of these projects.

In all there are thirty-six projects which may be undertaken. These range from a simple gold-leaf electroscope to a magnet which will attract nonferrous metals. A "brass" magnet? Well, here it is and it is a very interesting thing. I'm afraid I'm going to have to build one myself!

All the projects are clearly illustrated with photos, a lucid description of how they work, detailed constructional drawings and instructions on how to adjust and operate the device. Each chapter, at the end, has a list of questions for the student.

One project is the construction of a Copper and Nickel Electroplater. This should appeal to many who enjoy a basement shop. In restoring antique radios, etc., sometimes the nickel plating on binding posts is so thin that any attempt to polish them reveals the base metal beneath. Made to order for this job. The chemicals needed are easily obtained.

In the appendix is given a list of suppliers for some of the things needed which may not be available locally.

— *W1AVA*

Feedback

The company listed in footnote 4 to Hayward's "Direct Conversion — A Neglected Technique," November 1968 *QST*, can no longer supply toroidal coil forms for T_1 and T_2. However, a kit of two suitable toroids (type T-50-6) is available for $1.00, postpaid, from Amidon Associates, 12033 Otsego Street, North Hollywood, California 91607. In addition, Amidon Associates can supply for $1.00, postpaid, a kit of two suitable toroids (type T-68-2) for $L_1L_2L_3$ and L_4L_5.

— • • • —

The calls W3FU and W5NW should have been included in the "C.W. Certificate Winners" list in the Armed Forces Day 1968 article in *QST* for November 1968.

— • • • —

Due to an unfortunate error, Stanley Walderman, WA6HWX, ex-W2AME, 2AME, was listed in the "Silent Keys" column in *QST* for September 1968. Stan is quite alive and active.